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ABSTRACT

This report discusses the outcomes of a project that examined the acquisition of reading and writing skills in 135 children with deafness or who are hard of hearing. Eighty-three of the children attended a state-sponsored residential school and 52 attended a local school district program where students with deafness or who are hard of hearing are educated in special self-contained classrooms. Studies 1 and 2 examined reading achievement in two age-matched groups of these students in two school settings. These studies included a review of institutional variables of the settings where the students received their schooling and analyses of associations between the students' performance and these institutional variables. Studies 3 through 6 examined instructional strategies employed by teachers who use different modes of communication during reading and writing instruction in two distinct settings. Results found: (1) the proportion of students with deaf parents in the residential setting was nearly five times higher than that in the public setting; (2) ages of detection and of first educational contact were higher for students attending public school; and (3) three variables that correlated with reading achievement were parents with deafness, age of detection, and length of time in school. Other findings are also discussed. (CR)

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DEAF STUDENTS AS READERS AND WRITERS: A MIXED-MODE RESEARCH APPROACH

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Deaf Students as Readers and Writers:
A Mixed Mode Research Approach

Carol Padden & Claire Ramsey, Co-Principal Investigators

FINAL REPORT

I. Abstract of the project

This research examined the acquisition of reading and writing skills in deaf and hard of hearing children. The project included:

1) **a quantitative focus:** Studies 1 and 2 examined reading achievement in two age-matched groups of deaf and hard of hearing students in two schooling settings. These studies included institutional variables of the settings where they receive their schooling, and analyses of associations between the students' performance and these institutional variables. A battery of language tests was administered to a smaller group of students in order to study associations between reading achievement, language skills and demographic variables.

2) **a qualitative focus:** Studies 3-6 examined instructional strategies employed by teachers in two distinct settings who use different modes of communication during reading and writing instruction. These studies were coupled with analysis of deaf and hard of hearing students' responses to instructional language as documented in their interaction and engagement with instruction, in their reading and writing practices and in their written products.

One hundred thirty five deaf and hard-of-hearing students in two special educational settings participated in the project; 83 attended a state-supported residential school for deaf students and 52 attended a local school district program where deaf and hard-of-hearing students are educated in special self-contained classrooms.

The results of the studies were integrated into a comprehensive analysis of the process of teaching and learning at the two sites. The purpose of the quantitative study is to identify those background characteristics of students at the two sites that are associated with reading achievement. The qualitative study was informed by the results of the quantitative study and results were integrated into an assessment of the impact of observed classroom language use, instructional techniques and school setting on reading achievement. The combination of the two methodologies results in what is called a "mixed-mode research approach."

II. Project results

A. Study 1: Demographic survey

Research questions:

- What is the profile of the sample of deaf and hard of hearing students in each age group who attend school in each setting?
- What is the schooling history of each child in the sample?

In order to compare student populations at the two school settings, we developed a coding sheet that contained a wide variety of demographic variables. In addition to individual characteristics such as degree of hearing loss, additional disabilities, and age of onset of deafness, we included variables such as hearing status of parents, ethnicity, age of first educational contact, age when the child's deafness was detected, and use of a hearing aid. In addition, we recorded variables relating to the child's school experiences. For each year since the child enrolled in school, the name and type of school program the child attended was listed and coded. The length of time the child remained in one type of program (i.e. oral, total communication) was also recorded. This constituted a "tenure" variable. Changes in programs, from one type to another, were coded as a "change in program" variable.

We also coded for Stanford Achievement Test-Hearing Impaired (SAT-HI) scores that were present in the students' files. For purposes of analyzing correlations between reading achievement and demographic variables, we isolated scores on SAT-HI reading comprehension and math computation tests administered by the school within the last year. Across both school settings, 98 had valid SAT reading comprehension scores (SAT-R) and 74 had valid SAT math computation scores (SAT-M).

The list of background variables used for this study is as follows:

Student background	Sex Date of birth Hearing status of parents: deaf or hearing Age of detection of deafness Cause of hearing loss Age of onset of deafness Handicaps Use of hearing aid
Educational history by year	Age of first educational contact Name of school attended Type of program Change in program attended
SAT-HI scores	Math computation Math concepts Math applications Reading comprehension Language score Spelling score

The first and most striking result of our survey can be seen in Table 1. Deaf children at the public school were nearly twice as likely to have a physical handicap such as impaired vision or movement than the residential school. The ethnic status of the students in the public setting indicated a much higher degree of heterogeneity than in the residential setting. The proportion of students with deaf parents in the residential setting was nearly five times higher than that in the public setting. Ages of detection and of first educational contact were higher for students attending public school than for those in the residential program.

Demographic Variable	Public School Setting	Residential School Setting
Handicaps	19%	10%
One or more deaf parents	8%	39%
Ethnicity (% white)	33%	70%
Age of first educational contact	3.125 years	2.34 years
Age of detection of deafness	2.2 years	1 year
Tenure in program	3.5 years	3.2 years
Degree of hearing loss (average on scale of 1-4)	3.06	3.45

Table 1. Survey data comparisons across school settings, n=135.

Some of the differences may be due to locations of the schools we studied. The higher presence of handicaps in the public school might have resulted because children are medically fragile, or are in more need of parental care, are more likely to be placed in a school nearer home such as a local public school, rather than sent to a residential program. Children with severe emotional or physical handicaps are not included in our large sample, but children who have a handicap that may be medically related are. The difference in ethnicity may be due to the regional differences of the two school settings, but location cannot be a sole determining factor because both schools are mandated to draw from within their metropolitan areas, and the areas are ethnically diverse.

The remaining differences appear to be influenced by the presence of deaf children who have deaf parents at the residential school. Thirty-nine percent of the students in our residential school sample have deaf parents compared to only 8% in the public school. The presence of this population contributes to lower age of detection and age of first educational contact, and to the percentage of white children at the school. Deaf parents are more likely than hearing parents to recognize deafness in their child at an early age and to locate schooling for their deaf child at an earlier stage, pushing overall means to lower ages for children at the residential school setting. And of our population of deaf children of deaf parents at this school setting, 78% are white. (Prevalence of deafness is higher among the white population than in other groups (Holt & Hotto, 1994).)

When we examined test achievement scores by school setting, we found differences. Table 3 shows the means for the SAT-R and SAT-M scores, organized according to school setting and grade level. Although the main focus of our research has been reading achievement, we included the math scores in order to evaluate the general levels of achievement that the students in this sample have reached, as well as using them as an index to their test-taking skills.

Grade	Residential school		Public school	
Elementary	SAT-R	SAT-M	SAT-R	SAT-M
	504.3	562.5	500.13	526.8
Middle	SAT-R	SAT-M	SAT-R	SAT-M
	604.33	642.07	561.85	616.38

Table 2. SAT-HI means, by grade and school setting.

Table 2 shows that the students in the large sample are competent test-takers, as evidenced by comparable scores in the math and reading subtests. Further, it shows that across both settings middle school student' scores improve, indicating an expected academic progression despite the differences noted above. In other words, as deaf children remain in school, their reading scores improve. Beyond these general patterns, we observed differences in SAT scores at grade level and by school setting. At grade level, we find that SAT-R scores for elementary residential students are slightly higher than for those for elementary public students, although not significantly so. However, SAT-R scores rise for middle school students in the residential setting to where they are significantly higher than those for their public school counterparts ($t(32) = 2.91$, $p = 0.0033$). The differences in the SAT-M scores are not significant.

The generally higher scores of residential school students is influenced by the larger presence of deaf children of deaf parents in the residential school setting who score significantly higher as a group on the SAT-HI (SAT-R: $t(20) = -3.53$; SAT-M: $t(23) = -2.31$). (See Table 3).

Test	Parent hearing status		
	Deaf	Hearing	T-test
SAT-R	596.06	527.59	**p<0.002**
SAT-M	628.13	586.47	**p=0.015**

Table 3. Means for SAT-HI scores by hearing status of parents, collapsed across setting

Because generally deaf children of deaf parents are exposed to ASL from an early age, a strong interpretation of these large differences in scores might be that knowledge of ASL supports school achievement as well as reading achievement. But we also found that within the group hearing children of deaf parents, those who scored higher on our ASL tests (discussed in the next section) tended to do well on the SAT-R. A more cautious interpretation would be that broad language skills, including sign language skills, support reading achievement particularly for profoundly deaf children.

When we set aside the group of deaf students from deaf families from our large sample, we found the residential school means were no longer significantly higher. Unlike deaf students with deaf parents who were predominantly enrolled in the residential school setting, students with hearing parents in our large sample were almost equally distributed in the two settings, yielding comparable sizes of students. The data for the students with hearing parents was then sorted according to school setting, collapsed across grade level and analyzed (Table 4). We found only SAT-M scores to be significantly higher. SAT-R scores did not differ by a large degree.

Test	School setting		
	Residential	**Public**	**t-test**
SAT-R	533.0 (n=30)	521.6 (n=27)	not significant
SAT-M	601.2 (n=30)	570.1 (n=27)	**p = 0.028**

Table 4. Means for test scores for students with hearing parents, by school and t-tests

The lack of statistical reliability for the differences in performance except for the SAT-M could be due to small group size, particularly for the language battery tests or the result of collapsing across grade level, or both. But a key finding is that once the population of deaf children of deaf parents is removed from the sample, neither school setting appears to offer a distinct advantage. In a capsule, our results show that both school settings face challenges educating deaf children of hearing families and teaching them to read.

In conclusion, we found three variables to correlate significantly with reading achievement: deaf parents, age of detection, and length of time the child has been in school, or tenure (Table 5). As our results show, age of detection was a better predictor of reading achievement than age of onset for this population of severely to profoundly deaf children. These variables taken together point to the strong influence of language experience at an early age, when parents can confirm deafness and reorganize family resources, and school experience on reading achievement. Because our study population included primarily severely to profoundly deaf children, other variables typically reported for reading achievement such as age of onset or degree of hearing loss were not significantly related to reading scores.

Variable	Correlations with SAT-R	
	Pearson's R	**Significance**
Deaf parents	0.3875	0.0001
Age of detection	-0.31496	0.0024
Tenure	0.44287	0.0001
Age of onset		not significant

Table 5. Correlations between SAT-R and demographic variables

B. Study 2: Battery of language tests

Research Questions:

- What is the language competence in English and in ASL of students in each setting and each age group?
- What range of reading and writing abilities is found in the sampled students?
- How do language test scores and SAT scores of the sampled students correlate?

In addition to collecting demographic and schooling history data, we administered a battery of eight tests measuring English and American Sign Language (ASL) abilities. Our aim was to evaluate reading skills of a representative group of students against a

broader range of signed, reading and writing skills. We wanted to know what component skills the students had and whether the skills were interrelated, e.g. whether skill in ASL was related to reading ability.

Three were tests designed to measure ASL ability. The Imitation test involved viewing a videotaped ASL sentence signed by a native signer, and repeating it back to a video camera. Semantic substitutions were accepted as correct, but production errors or deletions in the signed response were coded as incorrect (see Mayberry & Fischer 1989). The Verb Agreement Production test (Supalla et al., in press) asked the student to view action between two individuals and inflect a signed verb to correspond to the action. Their responses were also videotaped and then coded. The third test, Sentence Order Comprehension (Supalla, et al., in press), presented students with signed sentences on videotape in which sentence order is manipulated. Students are then asked to point to a picture in a set that represents the meaning of the sentence.

The remaining tests evaluate knowledge of English-influenced vocabulary in ASL. One vocabulary type, called initialized signs, are those in which the handshape of the sign corresponds to the first letter of its English translation. Another type of vocabulary is fingerspelled words, where each handshape corresponds to the orthography, or the letters of the English word. Based on our observations showing that these vocabulary were present in the classrooms we studied, we devised two tests to evaluate how well students could recognize initialized and fingerspelled forms. In the Initialized Signs test, students were asked to view on videotape a native signer producing a sentence containing an initialized sign and then to write the English translation of the initialized sign which was repeated at the end of the sentence. We scored performance on the task such that the word did not need to be spelled correctly, but needed to be recognized as the target word by three naive independent hearing adult readers. For the Fingerspelling task, students watched a sentence on videotape containing one fingerspelled word, and were prompted to recall the fingerspelled word. They wrote the word on a response sheet. This was scored according to an exact written replication of the fingerspelled word, that is, the response had to be correctly spelled. Together with the standardized SAT-HI tests, our battery of tests evaluated a range of language abilities from reading and math to ASL ability and knowledge of vocabulary used to represent English vocabulary in signed form.

First, we found a relationship between two tests of ASL ability and the student's score on the SAT-R. (A third test, Sentence Order Comprehension, did not reveal differences among groups of signers in our sample.) The same relationship held within the public school population, nearly all of whom have hearing parents and we would surmise, have less contact with ASL than the residential school population (Table 6). We expect that students who have better sign language skills in general, not just ASL skills, do well on these tests. And of those who do well, they appear to also do well on the SAT-R.

ASL test	Correlations with SAT-R	
	Pearson's R	Significance
Verb Agreement	0.56832	0.038
Imitation	0.53230	0.0062

Table 6. Correlations between SAT-R and ASL tests

Additionally, we found a relationship between our two tests of ASL ability and fingerspelling comprehension, and between fingerspelling comprehension and reading ability (Table 8). We draw two conclusions from this pattern of results. First, the ability to attend to fingerspelled words and then record their written English counterpart is not straightforward. Even for three- or four-letter words like 'wax' or 'bark,' we found many deaf children unable to write the words. It seems that the ability to comprehend fingerspelled words and write them in English is related to ASL ability. Deaf children who have less exposure to ASL also have less exposure to fingerspelling and do less well on the fingerspelling test.

Second, with respect to the relationship between fingerspelling and reading ability, it appears that less skilled ASL signers are not able to exploit fingerspelling as a resource for reading. Deaf children of deaf parents learn to use fingerspelling as a result of their long exposure to ASL and the role of fingerspelling in everyday ASL. We should be clear here that we are not suggesting that fingerspelling is the only, or the best route to reading. Instead, we suspect that there are multiple routes to reading development for deaf children, at least one of which is by way of ASL and resources unique to the language. For deaf children with little exposure to ASL, there are most likely other resources for reading development which we do not detect with our current battery of tests.

Language test	Correlations with Fingerspelling	
	Pearson's R	Significance
Verb Agreement	0.72594	0.0001
Imitation	0.87805	0.0002
SAT-R	0.52903	0.0079

Table 7. Correlations between Fingerspelling and language tests

With respect to the Initialized signs test, we found that residential school students who could successfully write the English translation of the initialized sign, at least recognizably, performed well on the SAT-R. The result is hardly surprising; Initialized signs give only one clue to their English translations, usually the first letter of the word. To be able to complete the word requires a sufficient knowledge of English vocabulary. Those who lack reading ability lacked the ability to retrieve and write English words which correspond to Initialized signs. What was interesting was that the relationship was much weaker for public school deaf students. Reading ability did not correlate with correctly reporting the translation of the initialized signs. We suspect that the overall depressed reading scores in this small population made it difficult to discern any pattern with respect to competence in English vocabulary.

School setting	Correlation between SAT-R and Initialized Signs test	
	Pearson's R	Significance
Residential school	0.92360	0.0001
Public school	0.37649	not significant

Table 8. Correlations between SAT-R and Initialized signs test by school setting

So far we have demonstrated only that there are relationships between sets of language skills, not whether skill in fingerspelling or initialized signs precedes reading development; it is entirely possible that improvements in reading skill lead to greater fingerspelling and use of initialized signs. We hope to examine these relationships more closely in the work we will be doing over the next few years. Our data also demonstrate that school setting interacts with clusters of language skills brought to bear on reading development, by offering opportunities for certain kinds of reading instruction.

C. Study 3 : Analysis of strategies for teaching reading

Research questions:

- How is discourse during English, reading and writing instruction structured in each setting?
- What languages are used in each setting in classroom discourse?
- How is fingerspelling used for instruction about English in each setting?
- What meta-level information about English and literacy is provided by teachers using each medium of instruction?

For our third study on how teachers provide reading instruction to deaf children, we assembled 90 hours of videotaped data from six classrooms involving 7 teachers. From this data, sample segments were selected; six 15 minute segments were identified for each teacher (two teachers team-taught the same classroom) making the total number of segments 42. The samples were selected from the first fifteen minutes of a lesson as initiated by the teacher.

Three teachers were selected from our public school classroom data. Four were selected from the residential school. Three of the teachers (one from the public school district and two from the residential school) are native signers. Four of the teachers (two from the public school district and two from the residential school) are non-native signers. Three of the teachers are deaf (one from the public school district and two from the residential school) and four are hearing (two from the public school district and two from the residential school). Included in this combination of characteristics was a hearing teacher of deaf parents.

Residential School				Public School			
Deaf		Hearing		Deaf		Hearing	
ASL	Engl	ASL	Engl	ASL	Engl	ASL	Engl
2	0	0	2	0	1	1	1
Total: 4				Total: 3			

Table 9. Numbers of teachers by native language and hearing status across school setting

Because we are continuing to analyze classroom language used by teachers and students, we report here on two of our first observations. First, deaf teachers fingerspelled more than twice as often as hearing teachers. Deaf teachers fingerspelled an average of 176 words (including repetitions of the same word) across all samples and hearing teachers fingerspelled an average of 75 words. Furthermore, residential school teachers fingerspelled an average of 152 words compared to public school teachers' average of 74 words. Within the public school setting, the deaf teacher accounted for more instances of fingerspelling than the two hearing teachers combined. Within the residential school group of teachers, although one deaf teacher had a very large number of instances of fingerspelling, there is little difference between the second deaf teacher and the two hearing teachers.

Second, the teachers who fingerspell often also tend to repeat the same fingerspelled word several times throughout a segment. Very often fingerspelling was used in what we called "chaining" structures.

Chaining is a technique used by some teachers to form a relationship between a sign, a printed word, and a fingerspelled word or sometimes all of them together. In this technique, a teacher might, for example, fingerspell a word, then immediately point to the same word printed on the blackboard, and fingerspell the word again. Or, a teacher might produce a sign and then fingerspell its English translation immediately after. This technique seems to be a process for emphasizing, highlighting, objectifying and generally calling attention to equivalences across texts and languages.

The teachers in our videotaped data varied in their use of this technique. Some teachers used a great deal of chaining during instruction, while others used it very little or not at all. Deaf teachers used an average of 30 instances of chaining while hearing teachers used chaining an average of 5.5 times. Residential school teachers used chaining an average of 21.5 times and public school district teachers an average of 8.7 times.

Teacher forms	Average occurrences			
	Deaf	Hearing	Residential	Public
Fingerspelling	176	75	152	74
Chaining	30	5.5	21.5	8.7

Table 10. Average number of occurrences of specific language practices by teacher hearing status and school setting

We expect that fluency in ASL accounts for some of the differences between deaf and hearing teachers with respect to fingerspelling and chaining since these are structures that appear commonly in everyday ASL. But not entirely. We found a native signer teaching in a public school in this study using little chaining and hearing teachers in the residential school using more fingerspelling and chaining compared to their counterparts in the public schools. It seems that school environments engender certain types of teaching and teaching techniques. Or alternatively, teachers who possess these techniques to begin with select the type of school setting where they are encouraged to make use of them.

As tantalizing as these observations might be, we make no claim at this time as to whether they are more effective in teaching reading. The fact of a preponderance of one set of techniques at one setting interests us as we study how features of school settings might organize reading instruction in different ways.

D. Study 4: Studying student-teacher interaction in the classroom

Research question:

- What types of interactions do teachers initiate with students? Students with teachers? Students with peers?

Because we are continuing to analyze student-teacher interaction in the classrooms, we report here on our first observations of contrasts between the public school and residential school settings. In the two public school classrooms, a great deal of instruction is carried out individually. Even if students appear to be seated in a group, the teachers manage to interact with only one or two students at a time. The other students do not participate in these interactions, and may not even watch them. The teachers do not expect students to participate as a group. In the two residential school classrooms, much of the instruction is carried out as whole class activities, often in discussions where all students are expected to participate.

As in many classrooms, the arrangement of the desks and chairs, and resulting use of space, is not random. In fact, the physical organization of the rooms displays the teachers' pedagogy to some degree. In the residential school, the teachers are not close enough to the students to touch them. Since the students sit at desks, in rows, teachers cannot use touching or tapping to get their attention. Rather, the students must give their attention to the teacher during lessons, and it is their responsibility to do so. In contrast at the public schools, the teachers are always close enough to students to touch them to get their attention.

Public school students cluster around the teacher at a small table. Of the 6 middle school students, for example, two boys dominate the group, and receive most of the turns. These two subtly maintain the teacher's attention by moving in their chairs, waving their hands, and by looking intently at her. After the first few minutes of class, the teacher shifts in her chair so that she is facing the boys, and facing away from the rest of the group. Two of the other four, all girls, do not bid for a turn unless the teacher looks at them, and they know they must answer the question she directs at them. The third girl sits outside the circle, away from the table, by preference. The fourth girl sits at the table with her hands in her lap, under the table, effectively blocking her hands from view.

In contrast, residential elementary school students sit in a wide semi-circle, as a whole class. While they do seat work, and sometimes collaborate on worksheets, they are never broken into work groups during literacy lessons. Their teacher follows the convention of hand-raising to bid for turns. Students follow discussions, predict openings in the discourse, recognize the cues and bid for turns as members of a group. While the teacher sometimes must ask a student to look or give reminders about how to participate in signed discourse (e.g. one student had a habit of asking a question then looking away), he did so through language.

The residential middle school teacher also expected her class to behave as a class. They were never divided into groups for special attention or individual teaching. Rather, they participated in class activities, raising their hands and bidding for turns during discussions. In our data, each time the teacher opened the floor, most of the visible students raised their hands. All students were participatory, and tried to get turns to give answers.

We do not make the case that individual one-on-one teaching in itself is poor pedagogy. Instead, our point is that teachers may come to use it extensively for two reasons that are directly related to the ways public and residential schools are organized. We found that in the public school classrooms we studied, student characteristics and abilites varied to a much greater degree than in the residential school classrooms. In addition, as noted above, the number of students enrolled in the two settings differ widely. At the residential school, the elementary level had 101 students compared to the public school's population of 70 students in the self-contained classrooms. At the middle school level, the difference was lopsided, with 105 at the residential school but only 18 at the public middle school self-contained classrooms. The number of classrooms a school can offer and the numbers of children, as well as the range of abilities and experiences they present, that are brought together in a school are influenced by enrollments. The majority of public schools simply do not have enough deaf children in their districts to create many groupings by ability, although between 70% and 80% of deaf and hard-of-hearing students attend a public school program. The residential school in our study has more choices in classroom grouping because it draws from a larger pool of students, those who live across many school districts. These facts about enrollments are the consequence of public policy. Because there are far more public school districts, and because of the relatively infrequent incidence of profound deafness, the majority of public school programs will have small numbers of deaf children compared to residential schools.

E. Study 5: Analysis of reading behaviors

Research Questions:

- What is the profile of readers in each setting?
- What range of reading coding and comprehension abilities is found in the sampled students?
- How is the range of abilities represented in student reading behavior?

We analyzed students' reading behavior with two goals in mind. First, we wanted to go beyond the deaf students' reading scores to discover if there were clues to students' reading achievement reflected in their observable strategies for approaching print.

Second, since our quantitative data suggests that deaf children's language skills in ASL, fingerspelling and print are interrelated, we wanted to examine deaf children's exposure to these skills in the classroom. Accordingly, we examined students' reading behavior in relation to what we know about the language instruction they receive in their schools.

Reading behavior data was generated by an aided read and re-tell activity. With teachers' assistance, we selected stories at, or a bit above, each child's reading level. The students were videotaped reading the story, signing "aloud" (with assistance if needed) and then re-telling it (with prompts if needed). "Reading in signs" was a common school task with which all of the students were familiar. (However, we do not assume that this task for deaf children is identical to reading aloud for hearing children). The transcribed reading was compared to the target story and coded for miscues. We used conventional miscue categories (e.g., omissions, substitutions, self-corrections, and observation of sentence boundaries). We also noted fingerspelling and mouthing, as well as use of items from the SEE lexicon (functor words) and the ASL lexicon (e.g. classifier predicates). The re-tellings were used to gauge students' comprehension of the story.

Among the elementary readers, we found two patterns of observable reading behavior, one characterized by "attacking and analyzing words," the second by "seeking meaning." Two students, Billy and Roy, provide instructive examples of these two reading strategies.

Billy is a 4th grader who has always attended a public school program for deaf students where a Total Communication pedagogy is in effect. Billy has deaf parents, and is a native signer of ASL. He is in the 56th percentile of severely-profoundly deaf readers his age according to his SAT-R score. On the ASL language tests, he scored below the mean on Verb Agreement and at the mean on Imitation (See description of tests in Study 2). He scored below the mean on the Fingerspelling test.

Billy's attention during his reading was focused on individual words. To Billy, reading meant mapping individual signs onto print words or morphemes. This strategy led to many miscues, most of which resulted in sentences that did not make sense within the meaning of the story. For example, in an illustrated story about baseball, he signed "flying mammal" in response to the print word "bat," and "swim" in response to "swing." In the former the researcher assisted him with the correct sign BASEBALL BAT, however Billy's confusion persisted, and the next occurrence of "bat" he fingerspelled the word, suggesting that he did not have a sense of the word or the story. On the latter, he hesitated as he made the miscue, re-checked the print, did not self-correct, and signed "SWIM" again. Billy was unable to respond to the text as he read, did not indicate dialogue, or represent character shifts, and failed to observed sentence boundaries or punctuation marks.

Billy attempted to represent each English morpheme with a sign. Accordingly, he made fluent and frequent use of SEE lexicon pronouns and copulas (HE, SHE, IS), although he used very few content signs from the SEE lexicon. He mapped ASL signs onto print words, but all were uninflected, and he did not use classifier predicates.

Billy's retelling was not comprehensible. Not only did it fail to relate the print story, it did not stand alone as a meaningful story. Rather, Billy signed a series of marginally related ideas, strung together with THEN. In another language task we administered, telling a signed narrative in reponse to an animated cartoon, Billy signed a completely comprehensible narrative, judged by natives to be a skilled ASL narrative. We know

that Billy's difficulty with the written narrative is not because he lacks general narrative skills, but because he does not comprehend written text very well.

Our second reader, Roy, is a 5th grader who attended a public school Total Communication program for deaf students through 1st grade, then transferred to a residential school, where he lives in the dorm. His school is developing a bilingual-bicultural pedagogy, and he has had several deaf teachers who use ASL as the medium of instruction. He has deaf parents, and is a native signer of ASL. He is in the 58th percentile of deaf readers his age according to his SAT-R score. On the ASL language tests, he scored below the mean of the group of students with deaf parents, with the exception of his perfect score on the Imitation task.

In contrast to Billy, Roy's attention during reading was focused on seeking meaning in the text. Like other meaning seeking readers in our sample, Roy scanned each page of text before he began reading. Between signed utterances, he kept his gaze on the page much longer than Billy, suggesting that he was reading beyond individual words. He observed sentence boundaries and other punctuation marks, he represented character shifts as characters spoke, and he consistently recognized and self-corrected his miscues.

Roy mapped individual signs onto print words selectively. For Roy, this strategy did not lead to miscues, and did not distort the meaning of the story. In addition, he translated print to ASL, and often used both mapping and translating in the same sentence. For example, an illustrated story about a dispute between the Sun and the Wind had this sentence "They saw flowers opening and birds flying." Billy signed "THEY SEE FLOWER OPEN BLOOM AND BIRD FLY-WITH-WINGS Cl: trace path birds flying around." Just as Billy's dominant strategy was to force exact match between parts of words and signs, Roy's dominant strategy was to look at sentences or even larger text structures, and seek coherent meaning in them. Roy devoted much less attention to representing individual English words in signs, and used SEE lexicon sparingly, alternating with fingerspelling (e.g. once he signed THE, but the rest of the time he fingerspelled it).

It is clear that students who devote their attention to individual words or morphemes cannot read with fluency, since this is only one element of skilled reading. Using this as a primary reading strategy will not help deaf readers develop the automaticity, speed and predictive abilities required for fluent reading. In addition, we hypothesize that readers like Billy, who see reading as a sign-word mapping task, are working with a smaller and less flexible vocabulary, as exemplified in his response to "bat." Students who use this reading strategy are less able to comprehend extended text, and as a result, we suspect, have less ability to access new vocabulary from print text (a primary source of vocabulary growth as young readers practice and develop fluency).

Readers like Roy, in contrast, are performing the complex orchestrated skill of reading, taking note of words and their potential meanings, moving rapidly enough to remember words as they read entire sentences, and building cohesion as they predict what will come next. In addition to the routine manipulation of symbols that reading demands, Roy's reading exhibits his developing bilingualism. Roy can exploit the translation potential between ASL and English, a relationship that we consider critical for ASL signers who are becoming English readers.

Billy and Roy make a provocative pair of contrasting cases. First, they both have Deaf parents, a group that outscored all others group in our research. Their reading scores are not significantly different, yet their reading strategies are distinct. Billy's skills are very

limited, he cannot orchestrate them, and he does not make purposeful use of reading. Roy has a range of reading skills which he can coordinate. Additionally he uses reading purposefully. Roy is very close to discovering what reading is, while Billy has not. We hypothesize that these differences are artifacts of experience and pedagogy. Simply put, deaf children are taught how to orchestrate their language competencies differently in the two settings.

F. Study 6: Teacher Interviews

Research questions:

- What are the characteristics of the teachers of the sampled students?
- How do teachers in each setting explain their attempts to help deaf children learn?
- How do teachers view student achievement in each setting?

Because we are continuing to analyze teacher interview data, we report here on two of our first observations. For this study, four teachers were interviewed, those whose classes were observed during the 1994-1995 academic year. The elementary teachers are both native signers; the residential school teacher is deaf, the public school teacher hearing. The residential middle school teacher is a hearing native speaker of English and the public middle school teacher is a deaf native speaker of English. Both of the middle school teachers learned ASL in their teens. The length of teachers' careers vary also. The two elementary teachers have both taught deaf students for over 30 years. The residential middle school teacher has taught for 10 years, and the public middle school teacher has taught for 2 years.

Not surprisingly, given the contrasting demographics and resulting organizational differences of public and residential schools that we discuss above, teachers' explanations of their work, and their models of what their deaf students need from instruction differ starkly. First, public school and residential school teachers have distinct beliefs about whether they are teaching individual deaf students or classes of deaf students. Public school teachers describe the difficulty of their work, brought about by what they consider to be dramatically varied classes of children. Yet, they prefer to teach children individually or in small groups. Residential school teachers expect to teach whole classes, and do so. For example, the two elementary classes we observed (one residential and one public) each had one multi-handicapped deaf student who used a wheel-chair and other assistive devices. In each setting, this student had an instructional aide hired specifically for him. In addition, the residential and public school elementary classes also had one student each whose school achievement and reading scores far exceeded her classmates. Each class also had several students who were newcomers to signing, and each had at least one student who was believed by the teacher to have an undiagnosed learning disability.

For purposes of organizing instruction, then, the classes each had a range of students. The range of abilities was greater at the public school, but neither class was homogeneous. The two teachers handled the variation differently, however. The public school elementary teacher claimed that she simply could not hold whole-class activities. She also stated that she believed that each deaf student must be seen as an individual, and that deaf children in general are more effectively taught as individuals, or in a very small groupings. In order to carry out teaching with this group of students, she prepared many individual lessons tailored to what she perceived as students' individual

differences. To assist her in preparing and carrying out the many individual, pair or trio lessons she conducted each day she had an assistant (in addition to the special instructional assistant) in her classroom all day everyday.

The residential elementary school teacher, in contrast, was not as compelled by the belief that deaf students must be seen as individuals. During his interview he spoke of his class as a group, while recognizing the strengths and weaknesses of each of the children. And as noted, he considered teaching his class as a group to be routine, and not extraordinary, as other residential teachers did, despite the range of children in his class.

The individual student/group of students contrast was also operative for teachers in their expectations about their students. The second contrast we observed in teacher interviews centered on the ways they discussed their motivation for teaching and their goals for their students. When discussing her underlying philosophy of teaching, the public school teacher noted that deaf students' most pressing need is to learn the structure of language. She understood that this was a challenging teaching task, however her belief was that deaf children could not really begin to read or understand subject area content until they had acquired explicit knowledge about the structure of English. In her model, deaf children are children who cannot genuinely learn other school subjects until they have synthesized a knowledge of language, and who are so fragile that they will fail to learn unless they experience constant attention and encouragement from teachers, and regular moments of success at school.

The residential school teacher, in contrast, repeatedly brought up a theme of autonomy when discussing his aspirations for his students. During his interview with researchers, he stated several times that deaf children must learn where to get information, how to read and interpret it, and how to transmit it to others. He felt this was among his most important pedagogical obligations. In addition, he routinely made a parallel statement to his students during instruction, reminding them that when they grew up they would want to locate information about various topics, and that this skill was important for deaf people. He also regularly admonished students to pay attention, because "When you grow up and have children, you'll need to explain this (e.g. weather patterns, English idiomatic expressions, how articulated buses are designed, or whatever topic was at hand) to them." The residential school teacher made clear his expectations that the students would grow up to be deaf people who would know how to learn and to seek information and would raise children, and transmit information to them. In his model, deaf children are not fragile learners; rather, they are students, whom he expected to participate in school, as well as to synthesize and to remember what he taught them.

As we build descriptions of the schools and teachers, and the students and their literacy achievement, we note that these differing views of teaching deaf children are not trivial. The cohesive picture of children and teachers in the two school settings remind us that what teachers of the deaf believe about their students, and the instructional activities they undertake as a result of their beliefs have consequences for student outcomes.

III. Dissemination

Web Site

During summer 1996, we began developing a web site, the purpose of which is to disseminate the work of our research group, the Research Program in Language and Literacy. The web site was launched in November 1996, and contains a statement of

purpose and description of our research program, brief biographies of staff, and abstracts of our publications of language and literacy research. As work currently in progress is completed, abstracts of results will be posted on the web site. The URL is crl.ucsd.edu/languageliteracy/

Advisory Committee

On June 21 and 22, 1996 we convened our committee of advisers for a second meeting. (The first was held in September 1994, prior to the beginning of data collection). The advisory committee has 9 members, teachers, parents of deaf children, university professors of deaf and general education, and deaf education administrators from Northern and Southern California. In addition, Professor Cecil Lytle, Provost of Thurgood Marshall College (one of the 5 UCSD undergraduate colleges) joined us. At this meeting, we presented an overview of the entire project and findings and preliminary findings of completed and in-progress work. In addition, we discussed with the advisers the planned next phase of our research and requested their assistance with dissemination of our results to their constituencies, particularly among parents of deaf children and practicing teachers.

Reports to schools and the Deaf community

We have also arranged to present our work formally and informally to the schools where we gathered data, and among members of the Deaf community. In March 1996, Ramsey reported findings at a meeting of the public school organization of parents of deaf and hard of hearing students. In July 1996, MacDougall attended the convention of the National Association of the Deaf, where she was able to discuss our research with Deaf people from around the country. In spring 1997, Padden will present findings to a meeting of parents and teachers at the residential school.

IV. Publications, papers and presentations of research resulting from this investigation

Padden, Carol. (1993). Lessons to be learned from the young deaf orthographer. *Linguistics and Education*, 5, 71-86.

Padden, Carol (1993). Goals for research on bilingual-bicultural education of deaf children. An opening address at the Working Conference on Language and Literacy Development for Deaf Children. Lexington School for the Deaf, New York, December.

Padden, Carol (1994). Early bilingual lives of deaf children. A keynote address at the Annual Meeting of the Association of Canadian Educators of the Hearing Impaired. Victoria, B.C., February.

Padden, Carol (1994). Culture and classrooms. A keynote address to the Conference of Educational Administrators Serving the Deaf, Portland, Oregon, April.

Padden, Carol (1994). Literacy education for deaf children. An invited workshop at the Annual Parents' Learning Vacation. Deaf Children's Society of British Columbia, Vancouver, B.C. August.

Padden, Carol (1994). English language acquisition in signing deaf children. A keynote presentation at *Issues in Deaf Education*, Bank Street College of Education, October.

Padden, Carol (1994) English language education of deaf children. An invited workshop at the annual conference of IMPACT-HI (Independently Merging Parents Associations of California for deaf and hard of hearing children). San Diego, CA, November.

Padden, Carol (1995). The promise of bilingual education for deaf children. Invited talk, Swarthmore College, January.

Padden, Carol (1995). English language instruction for signing children. Invited talk, Pennsylvania School for the Deaf, January.

Padden, Carol (1995). Foreign vocabulary in sign and oral languages. An invited workshop and public lecture. 1995 Linguistic Institute. The University of New Mexico, Albuquerque. July.

Padden, Carol (1995). How sign languages work. A seminar presentation to the Department of Cognitive Science, University of California, San Diego. October.

Padden, Carol (1996). How sign languages work. An invited presentation. The University of Virginia, Charlottesville, VA, March.

Padden, Carol (1996). ASL and reading in deaf children. Center for Total Kommunikation. Copenhagen, Denmark. August.

Padden, Carol (1996). Native and foreign vocabularies in sign languages. Sign Language Center. Helsinki, Finland. September.

Padden, Carol (1996). ASL and reading ability in deaf children. Paper presented at the Fifth International Conference on Theoretical Issues in Sign Language Research. University of Quebec, Montreal. September.

Padden, Carol (1996). ASL and reading skill. Department of Linguistics. University of Stockholm, Sweden. September.

Padden, C. [in press] The ASL Lexicon. *International Review of Sign Linguistics.*

Padden, Carol. (1996). Early Bilingual Lives of Deaf Children. In Parasnis, I. (ed.) *Cultural and Language Diversity: Reflections on the Deaf Experience.* Cambridge: Cambridge University Press.

Padden, Carol. (1996). From the Cultural to the Bicultural: The Modern Deaf Community. In Parasnis, I. (ed.) *Cultural and Language Diversity: Reflections on the Deaf Experience.* Cambridge: Cambridge University Press.

Padden, Carol & Allen, Sharon. (1995). "Deaf students as readers and writers." A presentation to the Conference of American Instructors of the Deaf. Minneapolis, MN June 1995.

Padden, Carol & Ramsey, Claire. (1993). Deaf Culture and Literacy. *American Annals of the Deaf,* 138 (2),96-99.

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Padden, Carol & Ramsey, Claire. (1995). School-in-ASL: The adaptation of community language to the classroom. American Association of Applied Linguistics, Long Beach CA: March 1995.

Padden, Carol & Ramsey, Claire. (1995). From the Deaf Community to the Classroom: ASL as Medium of Instruction. American Educational Research Association, San Francisco CA: April 1995.

Padden, Carol, Ramsey, Claire, MacDougall, Francine, Sterne, Susan, Allen, Sharon. (1994). "English language acquisition in signing deaf children" A seminar presented to the Laboratory for Brain and Cognition, The Salk Institute, San Diego, CA July 1994.

Ramsey, Claire. (1994). The Price of Dreams. *Full Inclusion: Implications and complications for deaf students.* Cohen, O. P. & Johnson, R. C. (Eds.). Gallaudet Research Institute Occasional Paper, 94-2. Gallaudet University: Washington DC.

Ramsey, Claire. (1994). Classroom Language and Literacy Learning among Deaf Second-Graders. Invited presentation, Division G meeting, American Educational Research Association, New Orleans LA: April, 1994.

Ramsey, Claire. (1994). Deaf children's early literacy: Interactions of American Sign Language and Print. Invited presentation. International Reading Association, Toronto, Ontario: May, 1994.

Ramsey, Claire (1994). Integration, Ideology And Studenthood For Deaf Children. Presentation. Inclusion: Defining quality education for deaf children Conference. Continuing Education and Outreach, Gallaudet University: Washington DC. Oct. 28, 1994.

Ramsey, Claire. (1996). A Deaf Adult in the Classroom: Signing about books, writing and English. In Higgins, P. & Nash, J. *Understanding Deafness Socially, Second Edition.* Springfield ILL: Charles C. Thomas Publisher.

Ramsey, Claire. (1996). New Perspectives on the Literacy Development of Deaf Students. Council for Exceptional Children Annual Convention, Orlando FLA. April 3, 1996.

Ramsey, Claire. [in press]. Deaf children as literacy learners. In Flood, J., & Heath, S.B. & Lapp, D., (Eds). (in press). *A handbook for literacy educators: Research on teaching the communicative and visual arts.* NY: MacMillan.

Ramsey, Claire (1996). Where is Deaf Culture in the Classroom? Working paper, Research Program in Language and Literacy. La Jolla, CA: UC/San Diego.

Ramsey, Claire & Padden, Carol, (Chairs). (1995). Literacy and Bilingualism in Deaf Education. Invited Colloquium. American Associated for Applied Linguistics, Long Beach CA: March 1995.

Sterne, Susan. (December, 1993). School ASL. Working paper, Research Program in Language and Literacy. La Jolla, CA: UC/San Diego.

Sterne, Susan (March, 1994). Prerequisites for Literacy: Regularities of a Deaf Classroom. Working paper, Research Program in Language and Literacy. La Jolla, CA: UC/San Diego.

V. Research papers in progress resulting from this investigation

Humphries, Tom & MacDougall, Francine. Links in the Chain.

Padden, Carol. ASL and reading ability in deaf children. In J. Morford, R. Mayberry & C. Chamberlain (eds.) *The Acquisition of Linguistic Representation by Eye.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Padden, Carol & Ramsey, Claire. The impact of school setting on the teaching of reading to deaf children. *Journal of Deaf Studies and Deaf Education.*

Padden, Carol & Tractenberg, Rochelle. Intended and unintended consequences of educational policy for deaf children.

Ramsey, Claire & Allen, Sharon. Teacher-student interaction in classrooms for deaf children.

Ramsey, Claire. Deaf children reading: Two models of reading behavior.

Ramsey, Claire & Humphries, Tom. Teacher epistemology, school setting and literacy learning.

Tractenberg, Rochelle & Ramsey, Claire. Deaf children of hearing parents in two school settings.